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NMRC Wound Infections Department Explores Therapeutic Bacteriophage Against Multidrug Resistant Bacterial Wound Infections

BY VJOHNSON – AUGUST 26, 2014

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Story courtesy of Naval Medical Research Center Public Affairs

SILVER SPRING, Md., — The Naval Medical Research Center's (NMRC) Wound Infections Department is exploring the use of bacteriophage as a therapeutic against Multidrug Resistant (MDR) bacterial wound infections.

The emergence of MDR skin and soft tissue infections has become a global problem for civilian and military populations alike, and in the warfighter, these infections are especially problematic when associated with traumatic/blast wounds.



Lt. James Regeimbal, a researcher in NMRC's wound infections department, speaks during seminar on exploratory use of bacteriophage as a therapeutic in the Behnke auditorium. (Photo by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

"MDR wound infections often require extensive surgical debridement, which further removes tissue harboring the recalcitrant infection," said Lt. James Regeimbal, a microbiologist in the NMRC Wound Infections Department. "Increasing the tissue loss in a severely wounded soldier can debilitate well beyond the damage of the original injury and new therapeutics are needed to improve the recovery and functionality of healing wounded warriors. It is vital to generate new therapeutics or reinvigorate older approaches to treating bacterial infections."

Bacteriophage are viruses that specifically infect and kill bacteria, and have been investigated as a potential antibacterial therapeutic. NMRC's phage working group purified five types of bacteriophage from waste-water in the Washington D.C. metro area that infect and kill MDR *Acinetobacter baumannii*.

"A. baumannii is a Gram-negative capsulated *coccobacilli* that causes significant infections in severely wounded

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military personnel,” said Regeimbal. “In joint collaboration with both the NMRC Biological Defense Research Directorate and Walter Reed Army Institute of Research -Wounds Department, our therapeutic phage cocktail greatly reduces the morbidity associated with the infection, primarily because the bacterial burden in the wound is significantly reduced with therapeutic phage treatment.”

Regeimbal added, “The cocktail also prevents bacterial invasion of the tissue surrounding the wound-bed that is seen in untreated controls. This apparent tissue protection reduces the ultimate size of the wound and the time to healing. The phage therapeutic also reduces the bacterial biofilm associated with the wound and eliminates the mortality and paralysis associated with *A. baumannii* wounds in mice.”

NMRCs Wound Infections Department seeks to isolate a diverse collection of phage from around the globe, in partnership with the OCONUS labs that can cover 80 to 90 percent of the methicillin-resistant *Staphylococcus aureus* (MRSA) and *A. baumannii* strains currently seen in the clinic.



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